# Effect of Age, Gender and Socioeconomic Status on Perceived Dental Anxiety

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#### 1.Abstract

**Background**: This study describes the role of gender, age as well as socioeconomic status on the dental anxiety of four to seven-year-old children.

**Method**: The study group included 1045 children of age four to seven years, 542 were males and 503 were females, 520 belonged to low and 525 to high socioeconomic status. Dental anxiety was analyzed by calculating scores by using Facial image scale along with Venham picture test after asking the question as to how a child would feel when he/she has to visit a dentist. The scales were used to record the answers of the children in their first dental visit and was carried out by the examiner dressed in a casual wear without scrub and apron while the children were waiting in the waiting area of the dental clinic.

**Results:** Statistical analysis was done after using one-way analysis of variance test, independent student's t test and paired Student's t test. The results obtained showed that the children of lower age groups had higher anxiety than children of higher age groups and perceived dental anxiety decreased as the age increased, it was more for females than males and more for children from high socioeconomic status.

**Conclusion**: Gender, age as well as socioeconomic status have an effect on dental anxiety, hence should be considered while measuring dental anxiety.

**Keywords**- Dental anxiety; age; gender; socioeconomic status (SES); Facial image scale (FIS); Venham picture test (VPT)

## 2.Introduction

Dental anxiety leads to prolonged chairside time and avoidance of dental care. It is essential that anxious children are identified at the earliest age.<sup>(1)</sup> Children that have dental anxiety usually have problems in oral health when compared to children who are non -anxious. We as dentists need to identify behavior that indicates anxiety for effective dental treatment.<sup>(2)</sup> This study was done to analyze dental anxiety with the help of Venham picture test and Facial image scale in the waiting area of the dental clinic in the first dental visit of 4 to 7 -year old children.

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#### 3.Literature review

Gender, age and socioeconomic status are determining factors in dental anxiety.<sup>(3)</sup> Previous studies have found a high correlation between validity of Venham picture test and Facial image scale.<sup>(4)</sup> Some of previous studies have found that there is negligible effect of gender on dental anxiety while few reported females have more.<sup>(2,3)</sup> Several studies have proved that there is a decrease in dental anxiety with increasing age while some reported no difference in the anxiety when both children and adolescents were compared.<sup>(2,3)</sup> Few studies have shown the relation between anxiety and socioeconomic status and proved that said that children from low socioeconomic status were found to be more anxious than children of high socioeconomic status.<sup>(3)</sup>

#### 4. Materials and methods

The two formulae were considered for sample

size calculation for the present diagnostic efficacy study. 1. Utilizing sensitivity and other 2. Utilizing

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Sample size (n) based on sensitivity =  $Z^{2}_{1-\alpha/2} \times S_{N}$ 

X (1-S<sub>N</sub>) /  $L^2$  X Prevalence

Sample size (n) based on specificity =  $Z_{1-\alpha/2} X S_N X (1-S_P) / L^2 X (1-Prevalence)$ 

Where,

n= required sample size,

S<sub>N</sub> = anticipated sensitivity,

S<sub>P</sub> = anticipated specificity,

 $\alpha$  = size of the critical region (1- $\alpha$  is the confidence level),

 $Z_{1-\alpha/2}$  = standard normal deviate corresponding to the specified size of the critical region ( $\alpha$ ),

L = absolute precision desired on either side (half-width of the confidence interval) of sensitivity or specificity.

Taking sensitivity and specificity both as 95% and expected maximum prevalence as 50%, L= absolute precision as 5% and Z=2 (for 95% confidence interval), from the above formula, sample size was found to be = 920.

For present study expecting 10% attrition or incomplete data collection, a minimum of 1012 subjects needed to be evaluated and hence, 1045 subjects were evaluated.

Facial image scale (Buchanan and Niven, 2002), includes 5 faces that varies from a very happy to a very unhappy face [Figure 1]. Scoring is done as 1 to 5 in this scale. <sup>(4)</sup>



Figure 1 Facial image scale

Venham picture scale (B Larry L Venham in 1977) is used by showing the child 8 pictorial cards of anxious and non-anxious picture and then the child is asked to choose the pictures one by one and the total number of fearful images that is chosen by the child is noted [Figure 2]. <sup>(5)</sup> Score is given from 0 to 8. All cards have to be shown in their order by number.

#### Figure 2 Venham picture scale

1045 children between four to seven years were



selected randomly by the random sampling method. While asking the children, examiner did not wear apron or the scrubs used in the dental clinics. Rather the assessment was done by the examiner dressed in regular or casual wear. Out of 1045 children, 542 were males and 503 were females, 520 belonged to low and 525 to high socioeconomic status.

Approval by ethical committee was provided by the institutional ethical committee of School of Dentistry and clearance was obtained from the same. The study was conducted according to the ethical of Helsinki's declaration. All participants gave an informed consent that was done by a letter of consent to be signed by the parents of the children prior to the study. SES was decided by Kuppuswamy's scale. (2014). <sup>(6)</sup>

The children were asked a question as to how they would feel when they have to visit a dentist, by both VPT and FIS individually. Children would point out at the figure that they would relate to, when asked. The scores were calculated for both the scales. Inclusion criteria was that the child should have no earlier dental visit and lack of any differential ability. Exclusion criteria was children below four and above seven years, presence of any systemic disease and lack of informed consent from the parents. The data was subjected to statistical analysis by using IBM SPSS version 24.0.

A pilot study was conducted among 100 children, in order to pre- test the method of

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examination and to train and familiarize the examiner with the survey. (7)

#### 5.Results

Table 1 shows the gender, age wise and SES participant distribution.

Age wise comparison of mean FIS scale scores (scale 1) showed that mean scale scores of 4- year was significantly higher than that of 5 and 6 -year age groups. The mean scale score of 6 -year age was not significantly different from all other age groups. (Table 2) Gender wise comparison of scale scores showed that mean (SD) scale scores of males and females was not statistically significant. (Table 3) Mean scores of high SES children was found to be statistically significant and higher than that of low SES children. (Table 4)

Age wise comparison of mean VPT scale scores (scale 2) showed that mean scores of 4-year was significantly higher than that of 5 and 6 and 7 -year age group. The mean VPT scale score was significantly different among all age groups. (Table

2) Mean scale scores of males and females was not

statistically and significantly different. (Table 3) Mean scores of high SES children was found to be statistically significant and higher than that of low SES children. (Table 4)

Age wise comparison of both scale scores revealed that mean FIS score was statistically significant and higher than mean VPT scale among 6 and 7- year age groups. Among four and five -year age groups, no difference that was statistically significant was found amongst both the two scales. (Table 2) Gender wise comparison of both scale scores revealed that among males, the mean score of FIS was higher than mean scale VPT score, but statistically insignificant difference was observed between both the scores. Among females, VPT score was higher than FIS and a difference was observed between the two scales scores that was statistically significant. (Table 3) SES comparison of both scale scores revealed that among high SES, the mean VPT was statistically significant and higher than mean FIS scale score. And for low SES, both scale scores were not statistically significantly different. (Table 4)

Table 1: Gender, age wise and SES pa	articip	bant	s di	istribution	
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	Gender	(n=1045)	SES (n=1045)		
	Males n (%)	Females n (%)	Low n (%)	High n (%)	
4 yrs (N=219)	115 (52.51)	104 (47.49)	106 (48.4)	113 (51.59)	
5 yrs (N=289)	151 (52.25)	138 (47.75)	130 (44.98)	159 (55.02)	
6 yrs (N=264)	139 (52.65)	125 (47.35)	134 (50.76)	130 (49.24)	
7 yrs (N=273)	137 (50.18)	136 (49.82)	150 (54.94)	123 (45.05)	
Total	542 (51.866)	503 (48.13)	520 (49.76)	525 (50.24)	
P <sup>a</sup> value	0.98	38, NS	0.004, S		

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<sup>a</sup>Chi square test

### Table 2: Age wise comparison of the two scales

	FIS scores		VPT scores		D <sup>d</sup> value of Inter group comparison
Age group	Mean	SD	Mean	SD	P value of inter group comparison
4 yrs	2.75	1.29	2.80	1.42	0.762, NS
5 yrs	2.63	1.40	2.66	1.74	0.784, NS
6 yrs	2.42	1.22	1.91	1.01	0.014, Sig
7 yrs	2.12	1.21	1.72	1.46	0.021, Sig
P <sup>b</sup> value of Intra group comparison	<0.001, S		0.003 <i>,</i> S		
Overall	2.37	1.29	2.312	1.435	0.002, S

<sup>b</sup>One way ANOVA test; dPaired Student's t test

# Table 3: Gender wise comparison of the scales

Condor	<b>FIS scores</b>		VPT scores		D <sup>d</sup> value of Intro group comparison
Gender	Mean	SD	Mean	SD	P <sup>®</sup> value of intra group comparison
Males	2.37	1.29	2.32	1.57	0.061, NS
Females	2.42	1.31	2.53	1.74	0.026, Sig
P <sup>c</sup> value of Intergroup comparison	0.910	, NS	0.837	7, NS	
Overall	2.395	1.30	2.425	1.655	0.045, S
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<sup>c</sup>Independent Student's t test; <sup>dPaired</sup> Student's t test

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Table 4: Socioeconomic status comparison of the scales								
655		<b>FIS</b> scores		VPT scores		D <sup>d</sup> value of Intra group comparison		
353	Mean	SD	Mean	SD	P <sup>*</sup> value of liftra group comparison			
	SES low	2.71	1.15	2.73	1.65	0.712, NS		
	SES high	2.80	1.41	2.98	1.72	0.001, S		
P <sup>c</sup> value	of Intergroup comparison	<0.00	)1, S	<0.00	D1, S			
	Overall	2 755	1 28	2 855	1 685	0.002 S		

<sup>c</sup>Independent Student's t test; dPaired Student's t test

#### 6.Discussion

In this study, these two scales are used as they are easy to be applied for young children. VPT helps in measuring response of young children to anxious and stressful situations. It provides access to the largely unexplored world of the child. (5)

There is a high correlation between validity of both these scales. (4) The problem with the VPT is that the figures used are all male, which may cause problem when the child is a girl. The scale uses a lot of time, hence is difficult to be applied in young patients. (4)

When the role of gender on dental anxiety is analyzed, some research reports (2) (3,8-12) reported no gender differences, while others (13,14-18) have shown that girls show higher dental anxiety. The present study proved that females had more anxiety than males. Gender wise comparison of both scale scores revealed that among Females, the mean score of VPT was statistically significant and higher than mean scale FIS score. Among males, statistically significant difference was not seen amongst scores of the two scales.

Several studies have implicated the relation in between age and dental anxiety as a decrease in dental anxiety with increasing age. (3) Similar results have been given by studies done by other authors. (5,9,19) Few have found no difference among both children and the adolescents. (2) while some showed that four to six and six to eight years revealed equal anxiety level. (20) Few have reported no effect of age on children's anxiety. The present study demonstrated that the children of lower age groups had higher anxiety than children of higher age groups. Dental anxiety decreased with increasing age probably due to awareness about dentistry in children of older age groups by watching advertisements on television that are related to toothpaste, toothbrushes or dentistry. (11)

Few studies said that there is no relationship of socioeconomic status with dental anxiety. (11) Studies that have been done in various public schools have shown a higher anxiety level than children of private schools. (14) Some researchers said that children from low socioeconomic status were found to be more anxious than children of high socioeconomic status. (3,18) The present study showed that children from high socioeconomic status had more dental anxiety than children from low socioeconomic status. SES. SES comparison of both scale scores revealed that among high SES, the mean VPT was statistically significant and higher than mean FIS scale score. And for low SES, no statistically significant difference was observed among the two scales. Higher anxiety levels in high SES children might be explained due to the differences in the type of services provided to the children. For instance, regular medical and dental check-ups are organized by the parents of high socioeconomic status, so they have a high peer group influence or the transfer of subjective fear and anxiety by their friends or family members.

Few studies (3) had eliminated children with previous dental experience as they wanted to investigate those fears and anxieties that arise from modelling or exposure to threatening information. Also, few researchers (1) have shown that previous dental exposure did not have significant influence on Venham Picture Scale scores of school children. In this study, children with previous dental visits were not included as children are free of objective fear in their first dental visit.

Many studies have been done in school environment. (3,12,13,14,18,21) But this study was done in the waiting area of the clinic in their first dental visit as children are free of the objective fear in their first visit as they have not seen the dental instruments or have never been exposed to the dental environment before. Hence, it is an ideal time and a good opportunity to understand the level of anxiety that they would be having before their first dental exposure and that will help us to take effective measures before the actual dental appointment that can be done by a preappointment counselling of the child and the parent and it can be done via a telephonic conversation or an online talk with both the child and the parent.

#### 7.Study implication

This study focused on dental anxiety in children

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of various age groups and differentiated the anxiety level between both genders and children from low and high socioeconomic status.

Findings of this study will help to reduce dental anxiety among children from different socioeconomic status, of different ages and both the genders.

# 8.Study limitation

This study was done in the waiting area of the clinic and thereby there would have been the influence of their parents on some of them who would have transferred their subjective fear to their children because of their own previous dental experience. For further research, sample size can be increased and the study can be conducted at schools and at community levels so that the overall dental anxiety of the larger community without the influence of their parents can be analyzed.

# 9.Conclusion

Dental anxiety among children is a significant challenge in providing dental care. Hence it is of paramount importance for the pediatric dentist not only to identify an anxious child but also to instill a positive attitude for dentistry.

- It is essential for a paediatric dentist to identify dental anxiety in his patient before the first appointment for treatment begins.
- Gender, age and SES play an important role on dental anxiety.
- Pre appointment counselling and behaviour management will be of great value in anxious patients for effective and efficient dental treatment.

## **Conflicts of interest**

None

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## Author contributions

Smita Singh Bhardwaj – study design, result analysis, manuscript writing.

Dr Basim Almulhim - Results and Discussion section. Dr Sara Alghamdi - selection of participants, and critical review. Dr Abdullah Al Assaf - collected data, analysis and interpretation of the data. Dr Atul Bhardwaj-, design and drafting the manuscript. All authors have read and approved the final version of the manuscript.

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